

# TYPHOON RITA

Rita, 1978's only super typhoon, was first detected as a cloud cluster in the tropical central North Pacific on the 14th of October. Migrating westward, she crossed the dateline early on the 16th and by 162300Z (Fig. 3-27) satellite imagery showed increased organization and developing feeder band activity. Consequently, a formation alert was issued on the system at 162347Z and six hours later, after continued development, the first warning was issued with 30 kt (15 m/sec) intensity. Thus, Rita was detected very early in her developmental stages and, based on the availability and maximum use of satellite data, a timely warning service was provided.

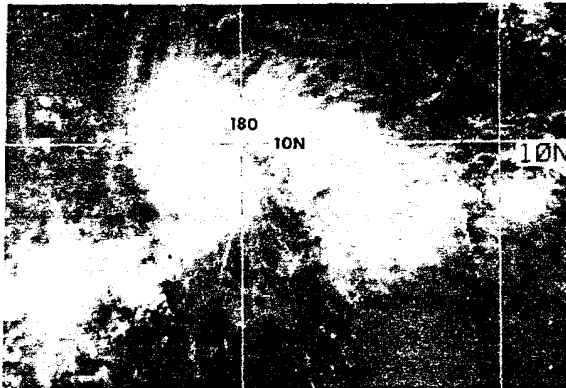


FIGURE 3-27. Rita, as she appeared just before issuance of her first warning, 16 October 1978, 2245Z. (DMSP imagery from AFGWC, Offutt AFB, NE)

From the time of the first warning until landfall on the Philippines, Rita tracked virtually straight westward. The major influence on her movement was the unusually strong mid-tropospheric subtropical ridge that built in over WESTPAC as Typhoon Phyllis was recurving. The strength of the easterly current south of the ridge steered Rita at forward speeds of up to 20 to 23 kt (37 to 43 km/hr); almost twice that of the climatological average. As could be anticipated from her track, JTWC's forecasts were consistent and errors were less than average. The larger errors were due to underestimates of forward speed and initial expectations of recurvature similar to Phyllis'. During her track across WESTPAC, Rita threatened a number of Pacific islands and atolls including those in the northeastern Marshalls, Enewetak and Guam. Rita's track near Enewetak brushed the northern tip of the atoll when maximum sustained winds were 75 kt (39 m/sec). At this time, Rita was a very compact typhoon and the main island on the southeastern portion of the atoll reported maximum sustained winds of only 35 kt (18 m/sec) with gusts to 45 kt (23 m/sec). By the time Rita approached Guam (Fig. 3-28) however, she had intensified dramatically to 150 kt (77 m/sec) and, therefore, posed a serious threat to the island.

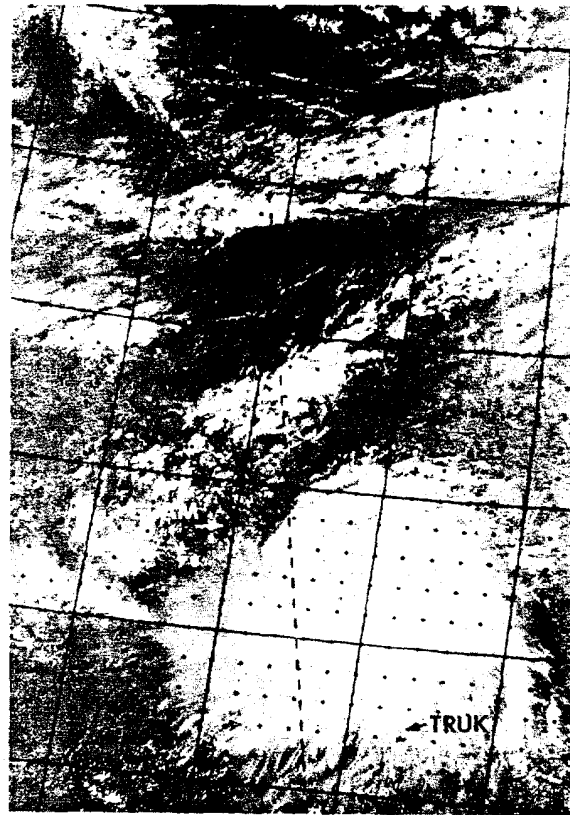


FIGURE 3-28. Rita, at 145 kt (75 m/sec) intensity, 16 hours before her closest point of approach to Guam, 22 October 1978, 2212Z. (DMSP imagery)

Rita was forecast to track south of Guam and maximum sustained winds expected for the center of the island (at Naval Air Station (NAS), Agana) were 70 kt (36 m/sec). Rita did indeed track south of Guam as forecast but maximum sustained winds reported at NAS Agana were only 35 kt (18 m/sec) with gusts to 55 kt (28 m/sec). In addition, precipitation on the island from Rita was unusually low. Post analysis reveals that the over-estimation of the maximum winds on the island was caused by two factors. The first factor was that Rita's actual track was 30-35 nm (56-65 km) south of the forecast track with actual CPA (closest point of approach) to NAS, Agana of 85 nm (157 km). Because Rita was compact, this 30 nm (56 km) error in track meant a large difference in Rita's influence on Guam. Had this been the only error, sustained winds would nevertheless have been over 50 kt (26 m/sec) at NAS, Agana. The second factor was the over-estimation of the over-30-kt (15 m/sec) and over-50-kt (26 m/sec) wind radii. These radii were based on surface wind estimates from aircraft reconnaissance (Fig. 3-29) and were forecast to expand. The 230600Z warning

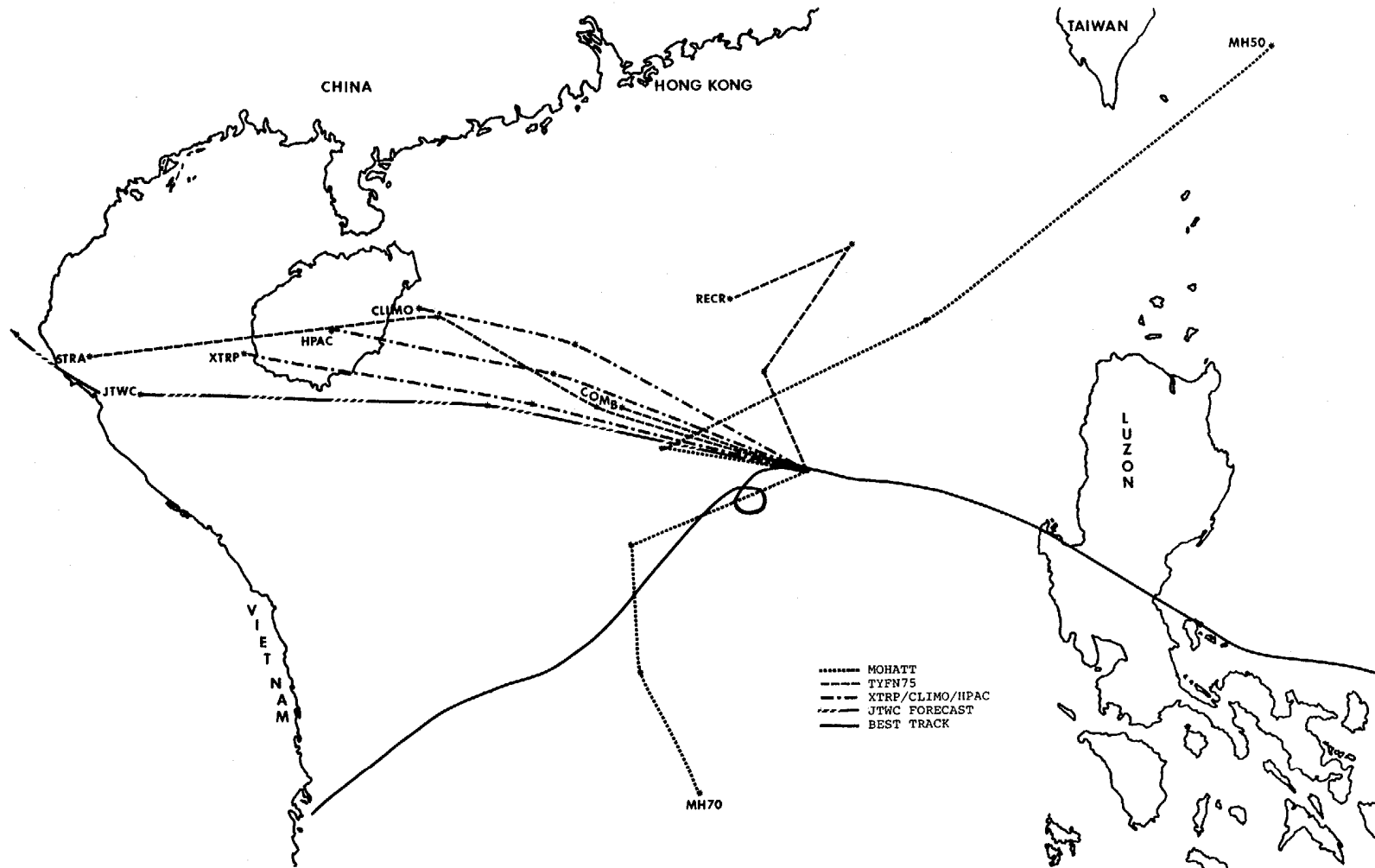


FIGURE 3-30. Plot of objective forecast techniques for 271200Z. Reference Chapter IV for description of each objective technique. Each \* represents a 24-hour forecast segment. The solid line represents Rita's best track.

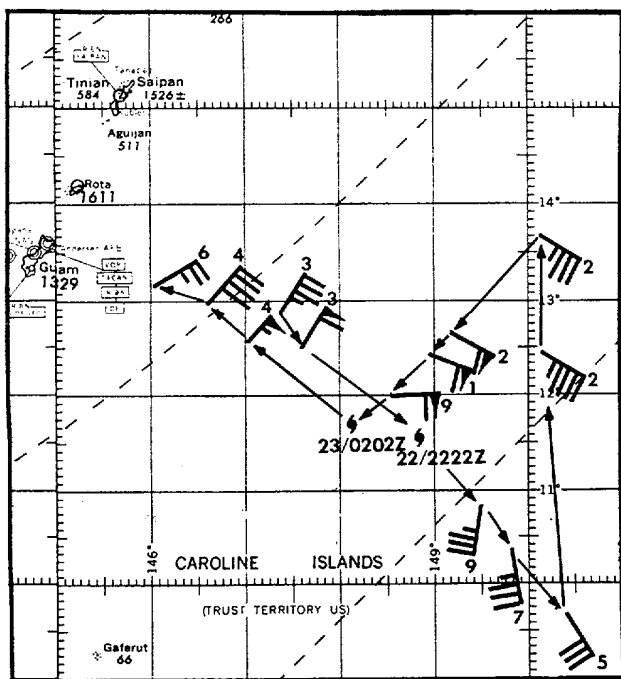


FIGURE 3-29. Plot of aircraft reconnaissance data. Typhoon positions are noted at 230200Z and 222222Z. Wind barbs are the estimated surface winds from the ARW0 aboard the aircraft. The tens digit of the wind direction is also plotted with the wind barbs.

showed a 185 nm (343 km) radius for over-30-kt (15 m/sec) winds and 100 nm (185 km) radius for over-50-kt (26 m/sec) winds in Rita's northern semicircle. Actual surface reports from the southern tip of Guam indicated the over-50-kt (26 m/sec) radius was actually only 70 nm (130 km). The over-30-kt (15 m/sec) wind radius was also too large as judged by the nine hour duration of sustained 30 kt (15 m/sec) winds at NASA Dan Dan.

If the over-30-kt (15 m/sec) wind radius had been 185 nm (343 km), the duration of sustained 30 kt (15 m/sec) winds would have been closer to 19 hours. It was evident that the wind field did not expand as forecast.

Unlike the relatively mild influence on Guam and Enewetak, the Philippines experienced considerable damage and many lives were lost during Rita's passage. Heavy flooding was reported throughout many of the cities and villages on Luzon, especially those just east and north of Clark AB. DoD facilities, however, sustained little damage in Rita's 12-hour passage over central Luzon. As she entered the South China Sea, aircraft and satellite data indicated that she had weakened considerably.

In contrast to the persistent synoptic situation over the Western Pacific which had steered Rita ever westward, the large scale features in the South China Sea were complex. As Rita exited the Philippines, a short-wave westerly trough was developing and moving eastward over the Asian mainland. The trough created a break in the mid-tropospheric subtropical ridge allowing for a northward adjustment in Rita's track. During this same time, however, a surge in the northeast monsoon was developing over China at low tropospheric levels which tended to steer Rita southward. Objective aids lacked consistency and reflected the contrast in the synoptic situation (Fig. 3-30). Eventually, the northeast monsoon surge proved to be the deciding factor in Rita's movement and she tracked southwestward toward the Vietnam coast and dissipated over water. Forecast errors were considerably larger during this latter segment of Rita's track.

Overall, Rita was the record setter for the 1978 season. Her track was the longest of the season and at her peak intensity of 155 kt, aircraft data recorded an 878 mb central pressure, only 2 mb higher than the record set by Typhoon June in 1975 (Fig. 3-31).

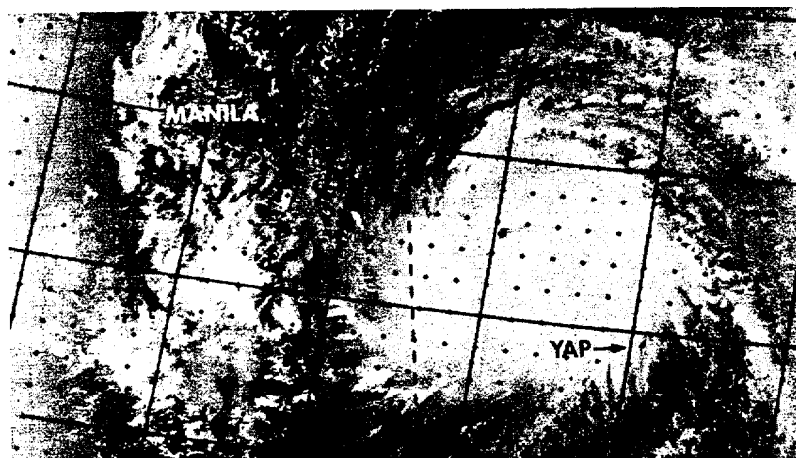


FIGURE 3-31. Rita, at 150 kt (77 m/sec) intensity, 6 hours prior to her peak intensity, 24 October 1978, 2319Z. [DMSP imagery].